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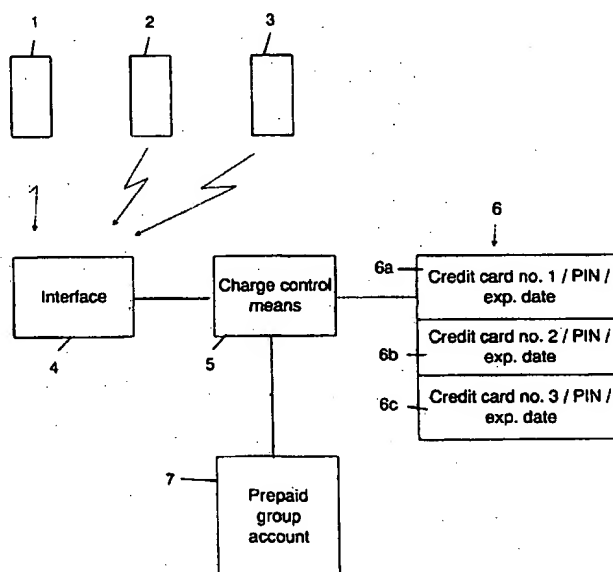
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(54) Title: TELECOMMUNICATION SYSTEM AND METHOD FOR OPERATING SAME



(57) Abstract: The invention relates to a telecommunication system and method wherein a rechargeable prepaid account is managed so as to provide a recharging possibility. Two or more credit cards can be used for recharging the prepaid account, providing greater flexibility. A management system of the telecommunication service provider comprises a memory for storing information on the at least two credit cards, which are allowed to be used for recharging the account. The system furthermore provides the possibility of creating a prepaid group account wherein several persons can commonly use the same prepaid group account, and can independently recharge the account by using his/her credit card.

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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## Telecommunication System and Method for Operating Same

Description5 Field of the invention

The invention relates to a telecommunication system and a  
method for operating same wherein a rechargeable prepaid  
10 account is managed so as to provide a recharging possibility.

Related prior art

EP 0 848 537 A1 discloses a telecommunication system wherein a  
15 telephone card itself is not loaded but where the telephone  
card is indirectly loaded in the network with a flexible amount  
to the account by means of a credit card. For recharging, the  
customer has to call a specific phone number and has to enter  
an identification number, the number of his/her credit card and  
20 the expiry date thereof. The telecommunication system checks  
this information for correctness. If correct, the account of  
the customer is increased by a specific amount.

One drawback of such a system is the impossibility of using  
25 different credit cards for recharging one and the same account.

Summary of the invention

The invention intends to provide a telecommunication system and  
30 method for operating same, wherein the possibilities of  
recharging a prepaid account are increased without loss of  
security.

The invention provides a telecommunication system comprising at  
35 least one phone and a rechargeable prepaid account managed by a  
management system of the telecommunication service provider,  
wherein the management system comprises a memory for storing

information on at least two credit cards, which are allowed to be used for recharging the account, in an authorization file, and a control means adapted to compare, when receiving a recharge command, credit card information received via phone  
5 with the credit card information stored in the authorization file, and to allow a recharging when the received credit card information coincides with one of the stored credit card information.

10 Furthermore, the invention provides a method as defined in claim 6.

Preferably the telecommunication system and method comprise at least two phones attributed to the same rechargeable prepaid  
15 account and having different phone numbers.

The authorization file preferably contains additional information related to the caller and/or to credit card or phone number, the control means being adapted to check  
20 additionally whether information entered by the caller corresponds to the stored additional information.

The invention provides the possibility of using different credit cards for recharging a prepaid account. Yet the  
25 possibility of illegally using a lost or stolen credit card for recharging an account is inhibited by providing, in the authorization file, a list of allowable credit cards. Only when the indicated credit card number coincides with a credit card number stored in the authorization file, a recharging is  
30 allowed. The system thus provides increased flexibility for recharging an account and opens the possibility of a prepaid group account wherein several persons can commonly use the same prepaid group account, and can independently recharge the account by using his/her credit card.

This group concept is suitable for any type of group such as a family, a small company, departments in a bigger company and the like.

- 5 This concept provides advantages even when only one phone number is attributed to the prepaid account as the recharging is now more flexible because of the possibility of using different credit cards. Preferably, however, two or more phone numbers are assigned to the same account. This allows the use  
10 of the same account by different persons having phones with selectively assigned phone numbers. The overall overhead is thus simplified. The subscriber needs to store only one account for a group, instead of several accounts for each member of the group. Further, the group needs to monitor only one account  
15 which can be recharged from any member of the group having a credit card being registered, in the authorization file, by the provider as admissible for recharging the account.

20 Brief description of the drawings

Fig. 1 shows the basic structure of an embodiment of the telecommunication system comprising a prepaid group account;

- 25 Fig. 2 illustrates a flow diagram of a method for recharging the prepaid group account; and

Fig. 3 shows an embodiment implemented as Intelligent Network (IN) solution.

30

Description of preferred embodiments for carrying-out the invention

- 35 Fig. 1 shows an embodiment of a telecommunication system incorporating the prepaid group account concept. The telecommunication system comprises several phones 1 to 3,

preferably mobile phones which communicate with the telecommunication system of the provider by means of an interface (for instance, a supporting node) 4. A charge control means 5 is functionally connected to the interface 4 and  
5 detects phone calls effected from one or more of the phones 1 to 3. The charge control means 5 cooperates with a memory 6 and controls a prepaid group account 7. The prepaid group account 7 is stored in a storage or database of the telecommunication system and is commonly assigned to all phones 1 to 3 belonging  
10 to the respective group.

When one ore more members of the group conduct calls from their phones 1 to 3 to third parties, the charge control means 5 calculates the phone fees and decreases the account level of  
15 the prepaid group account 7 appropriately. Therefore, several persons/equipments belonging to the group draw on the same account.

For recharging the account, any one of the members of the group  
20 can call, via his/her phone 1, 2, 3, either a specific phone number attributed for recharge purpose, and can input a recharge command. When detecting such a call or command, the charge control means 5 effects a check before enabling a recharge. In detail, the memory 6 comprises several storage  
25 sections 6a, 6b, 6c storing information on at least two (here: three) credit cards allowed for recharging the group account 7. The information contained in storage sections 6a, 6b, 6c include the credit card numbers (No. 1, No. 2, No. 3) and preferably additional data such as a secret PIN (personal  
30 identification number) and/or the expiry date of the respective credit card. In addition, each storage section may contain additional data on one or more phone numbers which are allowed to select one of the credit card information stored in the storage section for recharging purposes. The contents of the  
35 memeory 6 thus forms an authorization file.

When the charge control means detects a recharge call or recharge command issued from anyone of the phones 1 to 3 or through the Web, it requests the caller to input the credit card number to be used for recharge, and preferably additional  
5 identification data such as the expiry date of the credit card and/or the PIN number assigned to the caller (subscriber). The charge control means 5 then compares the entered information with the data stored in memory 6. If the entered data coincides with the data stored in one of the storage sections 6a, 6b, 6c,  
10 the charge control means 5 proceeds to the step of increasing the group account level by a sum indicated by the caller, or alternatively by a fixed amount. The charge control means 5 additionally sends information to the credit card issuer for debiting the credit card account.

15

The charge control means 5 and the memory 6 thus provide a management system for managing the prepaid group account 7. In the present example, three mobile phones 1 to 3 and three storage sections 6a, 6b, 6c are provided. However, the present  
20 invention can also be implemented by using only two, or four or more phones assigned to the same group account 7. It is also possible to assign only one phone to account 7. Furthermore, the number of storage sections 6a... can likewise be varied to two, four or more storage sections, corresponding to the number  
25 of credit cards allowed for recharging the account 7.

Furthermore, the number of storage sections does not need to coincide with the number of phones assigned to the same account.

30 Each storage section 6a... can additionally contain data on a phone number. The charge control means 5 is then adapted to compare the phone number of the calling party with the phone number data stored in the storage sections, and to select only that storage section which contains the corresponding phone  
35 number data. In this case, each storage section is fixedly assigned to a respective phone 1, 2 or 3. Each caller can then recharge the account only when inputting correct credit card

information stored in the respective storage section attributed to his/her phone number.

Fig. 2 shows the details of one embodiment of the operating method in greater detail. In step 10, the subscriber places a call to the telecommunication service provider by using his/her phone 1, 2 or 3. The charge control means 5 detects, in step 11, whether or not this call is a request for recharge of the account. If no, the procedure jumps to the final step 15 (end of recharge process) so that the recharging procedure is stopped, and any other action requested by the call is effected. If the answer in step 11 is yes, the process goes to step 12 wherein a validity check is effected. The charge control means 5 checks whether or not a credit card number indicated by the caller corresponds to one of the stored credit card numbers. If no, the process again jumps to step 15 (end) so that any unauthorized use of a non-listed credit card is prohibited.

20 If the answer in step 12 is yes, the process proceeds to step 13 wherein the user is requested to enter further information such as PIN, an expiry date of the credit card or the like. The charge control means 5 then effects a check whether or not the entered data correspond to stored respective data. The control means 5 may also be adapted to check the phone number of the caller and the credit card number stored with regard to this phone number so as to detect a coincidence between the data stored with respect to the phone number of the present caller, and the data stored in the authorization file (contents of memory 6) with regard to this phone number. If lack of correspondence is detected, the process jumps to step 15 and ends. Otherwise, the process proceeds to step 14, wherein the prepaid group account 7 is recharged by an amount which is either fixed or selected by the caller. Thereafter, the process ends (step 15).



The system and method can also be implemented by adding an external validity check of the used credit card. This check may be added between the steps 13 and 14 and can be conducted by sending the credit card information to the credit card provider for checking whether the credit card is still valid and usable. This step increases the security against unlawful use of a (for instance, stolen) credit card. As an alternative, this external validity check may replace step 13 of Fig. 2. Step 15 may also be conducted externally by the credit card provider.

In an alternative structure, step 13 may be omitted so that the process immediately proceeds from step 12 to step 14.

Fig. 3 shows an embodiment of the invention which incorporates an Intelligent Network (IN). The basic structure and function of an Intelligent Network is for instance defined in European Telecommunication Standard ETS 300 374 of ETSI (European Telecommunications Standards Institute).

The system of Fig. 3 comprises a control means 9 which consists of distributed components such as a mobile switching center MSC, a service switching point SSP and a visitor location register VLR. These components and their operation as well as their cooperation with the mobile phones 1 to 3 are known and will therefore not be explained in greater detail.

The system furthermore comprises a service control point (SCP) 8 which is part of the intelligent network and is addressed by the service switching point SSP when encountering situations in which the system needs instructions for further processing the call handling.

When a subscriber is originating a communication, for instance placing a telephone call, the service switching point SSP addresses the SCP 8 which checks the credit amount available in the group account 7 and sends back to the SSP information for allowing a call in case of sufficient account. This information

may represent a small part of the available amount such as a short calling time duration. When this calling time duration is about to expire, the SSP is again addressing the SCP for receiving a further calling time duration. When the account is  
5 falling below a certain minimum level, the SCP instructs the SSP to issue a message to the subscriber informing same that the account will soon expire and the call be terminated unless a recharge of the account is effected. If the subscriber wants to recharge the prepaid account with a Credit Card, the  
10 subscriber can choose between two different entry points: Via the Internet (iSMAP) or via the phone (SMAP Voice). When receiving a recharge command, the SCP 8 will effect a recharge as explained above with regard to Fig. 2.

15 Furthermore, the SCP is also managing the account level reduction during calls in accordance with the money or time value of the calling time durations sent to the SSP.

The account contents can represent a money sum or an available  
20 total calling time duration. In the latter case, the recharge amount is converted to a corresponding allowable connection time.

The explained concept is of course applicable not only to phone  
25 calls but to all telecommunication connections including pure data connections such as an internet access.

Claims

5

1. Telecommunication system comprising at least one phone and a rechargeable prepaid account managed by a management system of the telecommunication service provider, wherein the management system comprises a memory for storing information on at least  
10 two credit cards, which are allowed to be used for recharging the account, in an authorization file, and a control means adapted to compare, when receiving a recharge command, credit card information received via phone with the credit card  
information stored in the authorization file, and to allow a  
15 recharging when the received credit card information coincides with one of the stored credit card information.

2. Telecommunication system according to claim 1, comprising at  
20 least two phones attributed to the same rechargeable prepaid account and having different phone numbers.

3. Telecommunication system according to claim 2, wherein the  
25 authorization file contains additional information related to the caller and/or to credit card or phone number, the control means being adapted to check additionally whether information entered by the caller corresponds to the stored additional  
information.

30

4. Telecommunication system according to claim 1, 2, or 3,  
comprising an intelligent network structure having at least one  
service control point which manages the prepaid group account.

35

5. Telecommunication system according to claim 4, wherein the intelligent network structure has at least one service switching point which addresses the service control point when handling an originating communication.

5

6. Method for operating a telecommunication system comprising at least one phone and a rechargeable prepaid account managed by a management system of the telecommunication service

10 provider, the management system storing information on at least two credit cards, which are allowed to be used for recharging the account, in an authorization file, wherein, when receiving a recharge command, credit card information received via phone is compared with the credit card information stored in the  
15 file, and a recharging is allowed only when the received credit card information coincides with one of the stored credit card information.

20 7. Method according to claim 6, with at least two phones having different phone numbers being attributed to the same rechargeable prepaid account.

25 8. Method according to claim 6 or 7, wherein the authorization file contains additional information related to the caller and/or to credit card or phone number, and wherein it is additionally checked whether information entered by the caller corresponds to the stored additional information.

30

9. Method according to claim 6, 7, or 8, wherein a service control point of an intelligent network manages the prepaid group account.

35

10. Method according to claim 9, wherein the intelligent network structure has at least one service switching point which addresses the service control point when handling an originating communication.

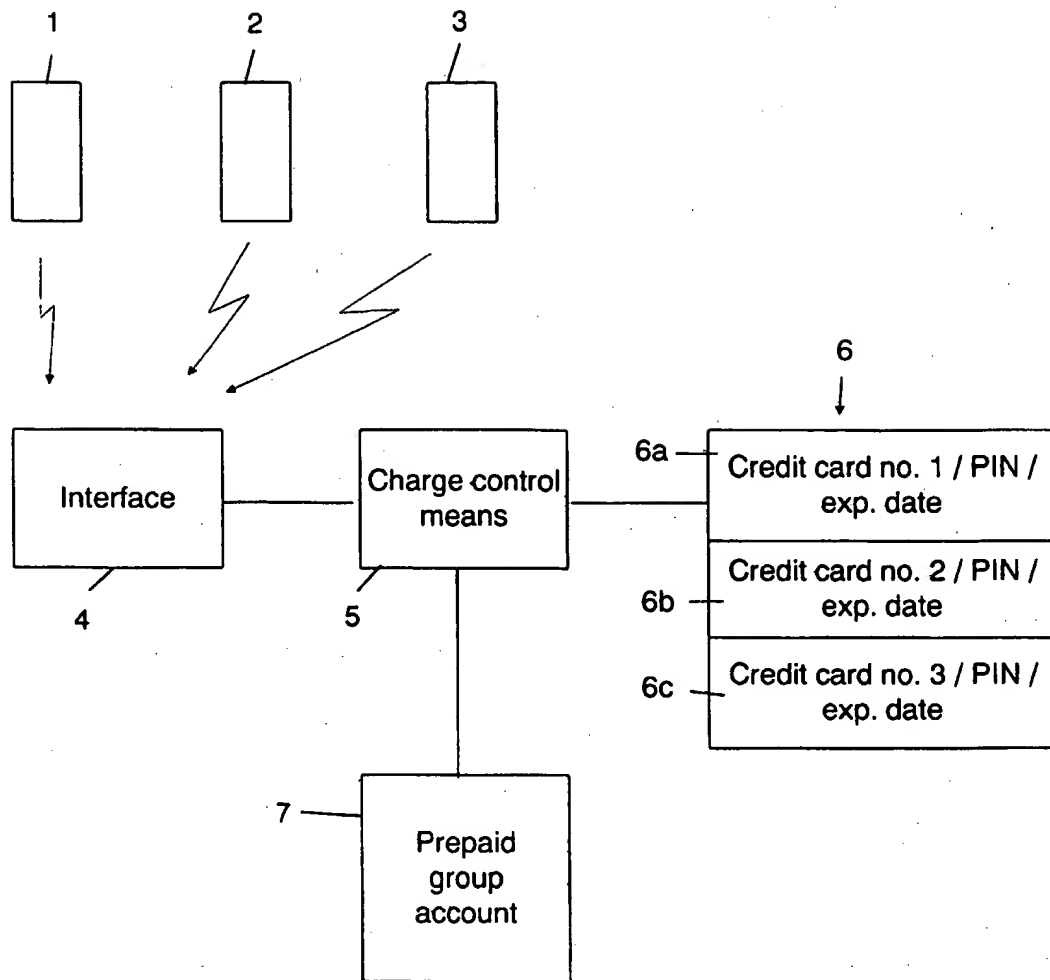
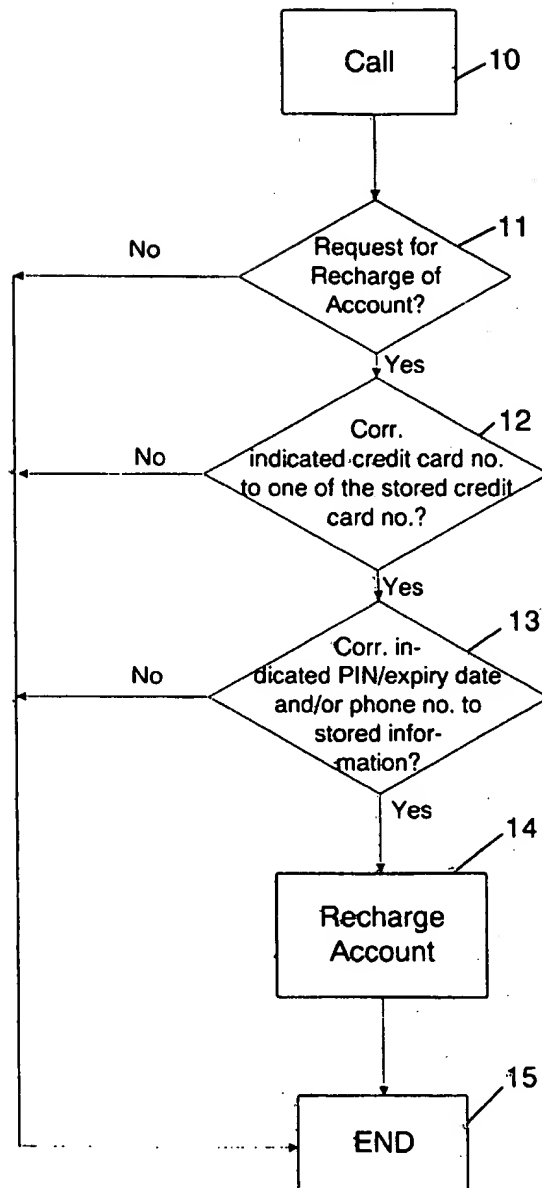
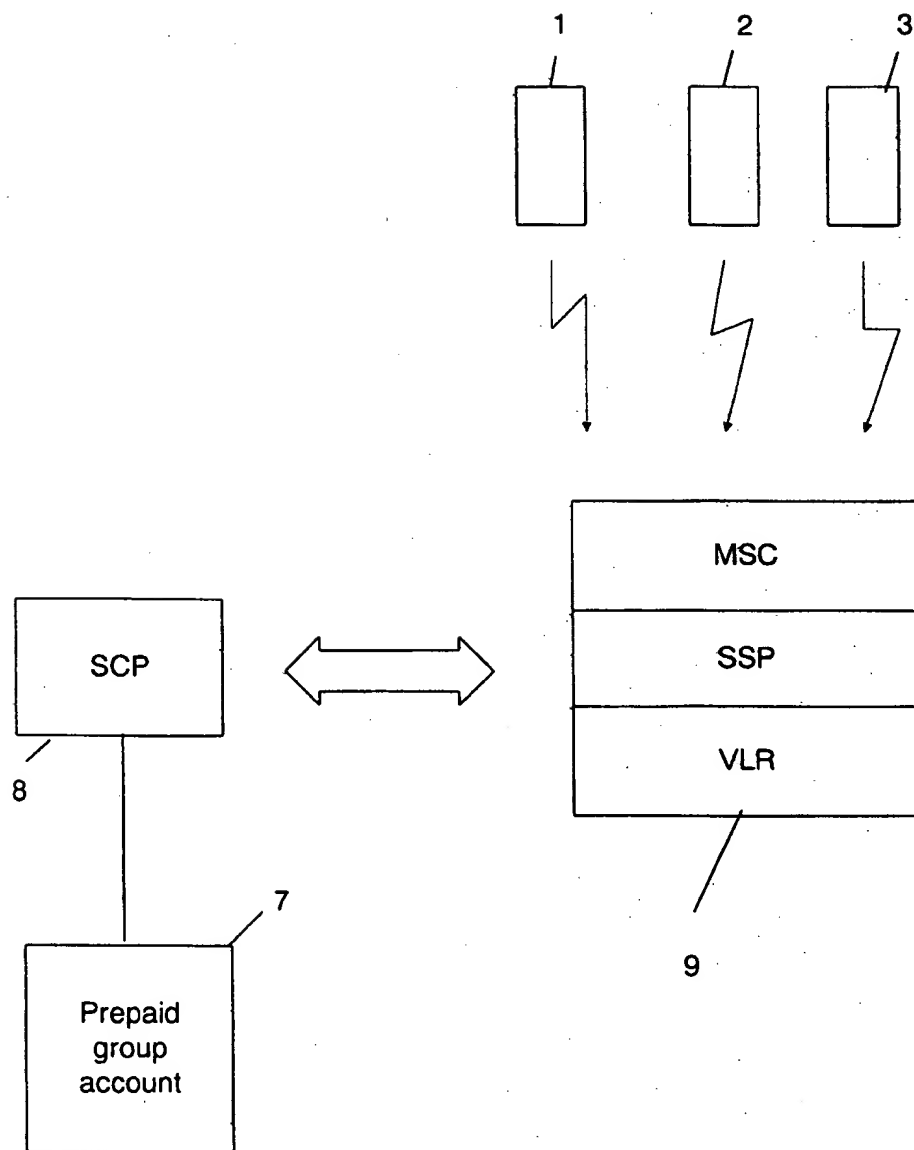
Fig. 1

Fig. 2

Fig. 3



## INTERNATIONAL SEARCH REPORT

In International Application No  
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A. CLASSIFICATION OF SUBJECT MATTER  
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According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04M G07F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 719 926 A (HILL VINCENT F) 17 February 1998 (1998-02-17)	1,6
Y	column 2, line 41 -column 3, line 7 column 7, line 1 - line 60 claims 1,2,11,12,20,21	2,3,7,8
Y	GB 2 313 744 A (ORANGE PERSONAL COMM SERV LTD) 3 December 1997 (1997-12-03) page 2, line 19 -page 6, line 8	2,3,7,8
A	US 5 469 497 A (PIERCE GEORGE C ET AL) 21 November 1995 (1995-11-21) column 2, line 49 -column 3, line 8 column 6, line 1 - line 16	1-3,6,7
	-/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 854 975 A (HARNED DAN B ET AL) 29 December 1998 (1998-12-29) column 3, line 50 -column 4, line 51 -----	2,7
A	US 5 815 561 A (NGUYEN HONG ET AL) 29 September 1998 (1998-09-29) column 6, line 27 -column 8, line 58 -----	4,5,9,10
A	GB 2 065 353 A (LANDIS & GYR AG) 24 June 1981 (1981-06-24) page 1, left-hand column, line 1 -right-hand column, line 72 -----	1-10
A	EP 0 848 537 A (PLUS MOBILFUNK GMBH E) 17 June 1998 (1998-06-17) cited in the application claims 1-12 -----	1-10

## INTERNATIONAL SEARCH REPORT

Information on patent family members

Int'l Application No

PCT/EP 00/00961

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5719926 A	17-02-1998	US 5953398 A	14-09-1999
GB 2313744 A	03-12-1997	AU 6415398 A	11-12-1998
		CA 2220378 A	23-11-1998
		WO 9853602 A	26-11-1998
		GB 2322771 A,B	02-09-1998
US 5469497 A	21-11-1995	NONE	
US 5854975 A	29-12-1998	US 5722067 A	24-02-1998
US 5815561 A	29-09-1998	NONE	
GB 2065353 A	24-06-1981	CH 646026 A	31-10-1984
		DE 3031470 A	04-06-1981
		FR 2471098 A	12-06-1981
EP 0848537 A	17-06-1998	NONE	